

Schillinger, et al.

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The diagram illustrates the central carbon metabolism pathways and their connections to amino acid biosynthesis. The main pathways shown are:

- Glycolysis/Gluconeogenesis:**
 - Glucose is converted to 3-phosphoglycerate by the enzyme *glucose*.
 - 3-phosphoglycerate is converted to PEP (phosphoenolpyruvate).
 - PEP can be converted to erythrose-3P, which then leads to shikimate and finally to the biosynthesis of phenylalanine, tyrosine, and tryptophan via the *EPSPS* pathway.
 - PEP is also converted to pyruvate.
- Amino Acid Biosynthesis from PEP:**
 - PEP is converted to glutamate via the *PAT* (phosphotransferase) pathway, which then leads to glutamine.
 - Glutamate can be converted to 2-ketoglutarate.
- TCA Cycle and Pyruvate Metabolism:**
 - Pyruvate enters the TCA cycle (labeled "TCA-cycle").
 - Pyruvate can be converted to valine and leucine via the *ALS* (aspartate aminotransferase) pathway.
 - Pyruvate can be converted to 2-ketobutyrate via the *ALS* pathway, which then leads to threonine.
 - Pyruvate can be converted to oxaloacetate, which enters the TCA cycle.
 - Pyruvate can be converted to aspartate, which then leads to threonine.
 - Pyruvate can be converted to 2-ketoglutarate via the TCA cycle.
 - 2-ketoglutarate can be converted to glutamate via the *PAT* pathway.

FIG. 1